

Software-Based Architecture for Communication and Cooperation Among  
Distributed Electronic Agents

ABSTRACT

5           A highly flexible, software-based architecture is disclosed for constructing  
distributed systems. The architecture supports cooperative task completion by  
flexible, dynamic configurations of autonomous electronic agents. Communication  
and cooperation between agents are brokered by one or more facilitators, which are  
responsible for matching requests, from users and agents, with descriptions of the  
10 capabilities of other agents. It is not generally required that a user or agent know the  
identities, locations, or number of other agents involved in satisfying a request, and  
relatively minimal effort is involved in incorporating new agents and "wrapping"  
legacy applications. Extreme flexibility is achieved through an architecture organized  
around the declaration of capabilities by service-providing agents, the construction of  
15 arbitrarily complex goals by users and service-requesting agents, and the role of  
facilitators in delegating and coordinating the satisfaction of these goals, subject to  
advice and constraints that may accompany them. Additional mechanisms and  
features include facilities for creating and maintaining shared repositories of data; the  
use of triggers to instantiate commitments within and between agents; agent-based  
20 provision of multi-modal user interfaces, including natural language; and built-in  
support for including the user as a privileged member of the agent community.  
Specialized embodiments providing enhanced scalability are also described.